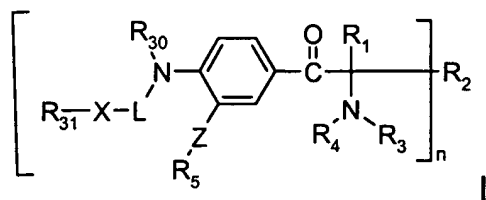


In the Claims:

1. (original) Photoinitiators of the formula I



wherein

n is 1 or 2;

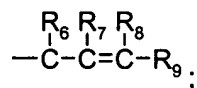
L is a linker;

X is -O-, -S- or -NR₃₂-;

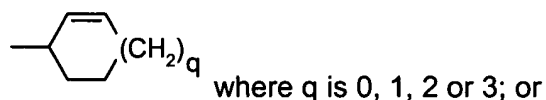
Z is a direct bond, -CH₂-, -O-, -S- or -NR₁₀-;

R₁ is

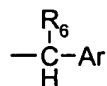
- (a) linear or branched C₁-C₁₂-alkyl, which is unsubstituted or substituted by one or more of the groups C₁-C₄-alkoxy, phenoxy, halogen or phenyl;
- (b) a radical of the formula



- (c) a radical of the formula



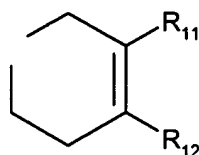
- (d) a radical of the formula



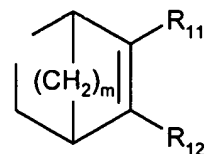
where Ar is phenyl, which is unsubstituted or substituted by one or more of the groups halogen, OH, NO₂, -N(R₁₀)₂, C₁-C₁₂-alkyl, C₁-C₄-alkyl that is additionally substituted by OH, halogen, N(R₁₀)₂, C₁-C₁₂-alkoxy, -COO(C₁-C₁₈-alkyl), -CO(OCH₂CH₂)_nOCH₃ or -OCO(C₁-C₄-alkyl); C₁-C₁₂-alkoxy, C₁-C₄-alkoxy that is additionally substituted by -COO(C₁-C₁₈-alkyl) or -CO(OCH₂CH₂)_nOCH₃; -OCO(C₁-C₄-alkyl), C₁-C₈-alkylthio, phenoxy, -COO(C₁-C₁₈-alkyl), -CO(OCH₂CH₂)_nOCH₃, phenyl or benzoyl; where n is 1-20;

R₂ if n is 1, independently of R₁ has one of the meanings of R₁; or

R₁ together with R₂ forms a ring of the formula



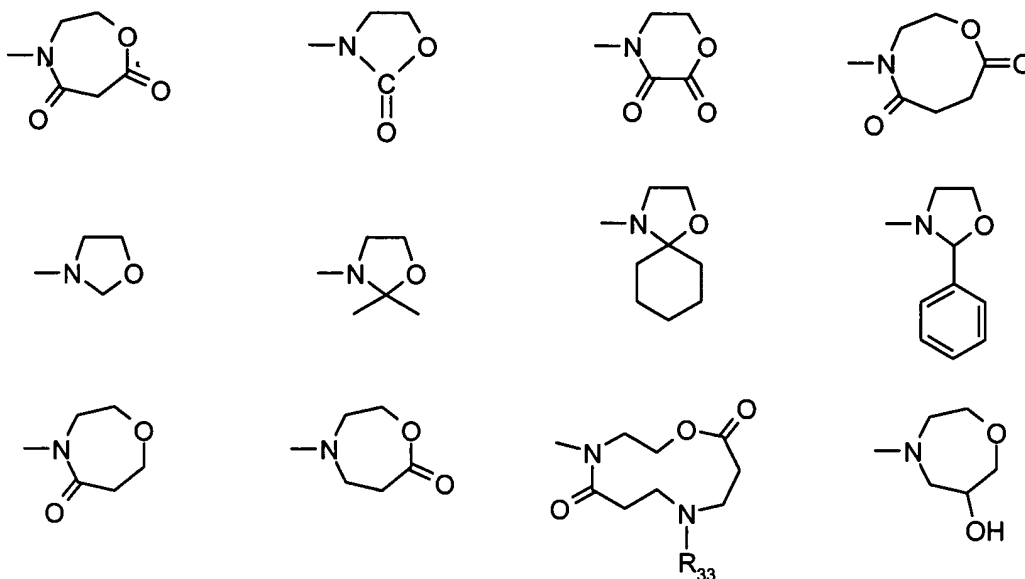
or



where m is 1 or 2;

- R_2 if n is 2, is a direct bond, C_2 - C_{16} -alkylene, cyclohexylene, xylylene, dihydroxyxylylene, C_4 - C_8 -alkenediyl, C_6 - C_{10} -alkadienediyl or dipentenediyl;
- R_3 is hydrogen, C_1 - C_{12} -alkyl, C_2 - C_4 -alkyl substituted by one or more of the groups hydroxy, C_1 - C_4 -alkoxy, -CN, -COO(C_1 - C_4 -alkyl); C_3 - C_5 -alkenyl, C_5 - C_{12} -cycloalkyl or C_7 - C_9 -phenylalkyl;
- R_4 is C_1 - C_{12} -alkyl, C_2 - C_4 -alkyl substituted by one or more of the groups hydroxy, C_1 - C_4 -alkoxy, -CN, -COO(C_1 - C_4 -alkyl); C_3 - C_5 -alkenyl, C_5 - C_{12} -cycloalkyl, C_7 - C_9 -phenylalkyl, phenyl; or R_4 and R_2 together is C_1 - C_7 -alkylene, C_7 - C_{10} -phenylalkylene, o-xylylene, 2-butenylene or C_2 - C_3 -oxa- or azaalkylene; or R_4 and R_3 together is C_3 - C_7 -alkylene that may be interrupted by -O-, -S-, -CO- or -N(R_{13})- and substituted by hydroxy, C_1 - C_4 -alkoxy or -COO(C_1 - C_4 -alkyl);
- R_5 is hydrogen or C_1 - C_4 -alkyl; or R_5 together with R_{30} is C_1 - C_2 -alkylene;
- R_6 is hydrogen, C_1 - C_8 -alkyl or phenyl;
- R_7 , R_8 and R_9 independently of each other are hydrogen or C_1 - C_4 -alkyl, or R_7 and R_8 together are C_3 - C_7 -alkylene;
- R_{10} is hydrogen, C_1 - C_8 -alkyl, C_3 - C_5 -alkenyl, C_7 - C_9 -phenylalkyl, C_1 - C_4 -hydroxyalkyl or phenyl;
- R_{11} and R_{12} independently of each other are hydrogen or C_1 - C_4 -alkyl, or R_{11} and R_{12} together are C_3 - C_7 -alkylene;
- R_{13} is hydrogen, C_1 - C_{12} -alkyl, which may be interrupted by one or more -O- or C_3 - C_5 -alkenyl, C_7 - C_9 -phenylalkyl, C_1 - C_4 -hydroxyalkyl, -CH₂CH₂CN, -CH₂CH₂COO(C_1 - C_4 -alkyl), C_2 - C_8 -alkanoyl, or benzoyl;
- R_{30} and R_{31} independently of one another are hydrogen, C_1 - C_{18} -alkyl or C_1 - C_{18} -alkyl substituted by hydroxy, C_1 - C_4 -alkoxy, -O-CO-(C_1 - C_4 -alkyl), -CN and/or -COO(C_1 - C_4 -alkyl); C_3 - C_{18} -alkenyl, C_5 - C_{12} -cycloalkyl, C_7 - C_9 -phenylalkyl, C_2 - C_{18} -alkanoyl, benzoyl or norbornenoyl; or C_2 - C_{18} -alkanoyl, benzoyl or norbornenoyl substituted by C_1 - C_4 -alkoxy, -NR₃₃R₃₄, -SR₃₅, -COOH or -COO(C_1 - C_4 -alkyl); or benzoyl or norbornenoyl substituted by hydroxy, or C_3 - C_5 -alkenyl, -SO₂-(C_1 - C_{12} -alkyl) or -SO₂-(C_1 - C_{12} -alkylphenyl); or -CO-NH- C_1 - C_{12} -alkyl or -CO-NH-(C_0 - C_{12} -Alkyl)-N=C=O optionally interrupted by one or two phenylene, methylphenylene, phenylene-O-phenylene, cyclohexanediyl, methylcyclohexanediyl, trimethylcyclohexanediyl, norbornanediyl, [1-3]diazetidine-2,4-dione-1,3-diyl, 3-(6-isocyanatohexyl)-biuret-1,5-diyl or 5-(6-isocyanatohexyl)-[1,3,5]triazinan-2,4,6-trion-1,3-diyl; or

R₃₀ and R₃₁ together with the group -N-L-X form cyclic structures selected from



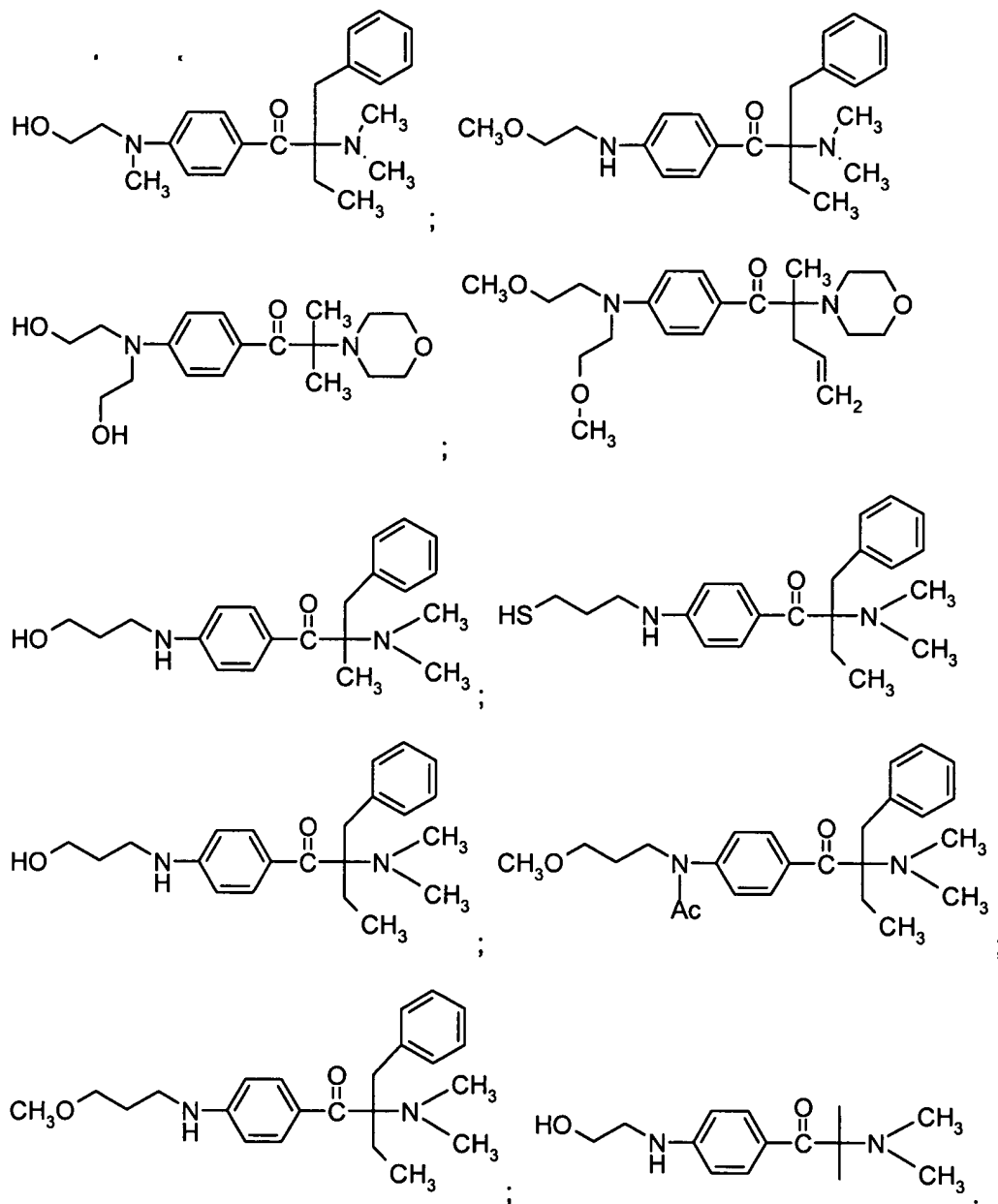
R₃₂ is hydrogen, C₁-C₁₈-alkyl or C₁-C₁₈-alkyl substituted by hydroxy, C₁-C₄-alkoxy, -O-CO-(C₁-C₄-alkyl), -CN and/or -COO(C₁-C₄-alkyl); C₃-C₁₈-alkenyl, C₅-C₁₂-cycloalkyl, C₇-C₉-phenylalkyl, C₂-C₁₈-alkanoyl, benzoyl or norbornenoyl; or C₂-C₁₈-alkanoyl benzoyl or norbornenoyl substituted by hydroxy, C₁-C₄-alkoxy, -NR₃₃R₃₄, -SR₃₅, -COOH or -COO(C₁-C₄-alkyl); or C₃-C₅-alkenoyl, -SO₂-(C₁-C₁₂-alkyl) or -SO₂-(C₁-C₁₂-alkylphenyl); or -CO-NH-C₁-C₁₂-alkyl or -CO-NH-(C₀-C₁₂-Alkyl)-N=C=O optionally interrupted by one or two phenylene, methylphenylene, phenylene-O-phenylene, cyclohexanediyl, methylcyclohexanediyl, trimethylcyclohexanediyl, norbornanediyl, [1-3]diazetidine-2,4-dione-1,3-diyl, 3-(6-isocyanatohexyl)-biuret-1,5-diyl or 5-(6-isocyanatohexyl)-[1,3,5]triazinan-2,4,6-trion-1,3-diyl;

R₃₃ and R₃₄ independently of one another are hydrogen, C₁-C₁₂-alkyl, C₂-C₄-hydroxy-alkyl, C₃-C₁₀-alkoxyalkyl, C₃-C₅-alkenyl, C₅-C₁₂-cycloalkyl, C₇-C₉-phenylalkyl, phenyl, C₂-C₁₈-alkanoyl or benzoyl; or R₃₃ and R₃₄ together are C₂-C₈-alkylene optionally interrupted by -O-, -S- or -NR₃₆, or are C₂-C₈-alkylene optionally substituted by hydroxy, C₁-C₄-alkoxy, -O-CO-(C₁-C₄-alkyl), or -COO(C₁-C₄-alkyl);

R₃₅ is C₁-C₁₈-alkyl, hydroxyethyl, 2,3-dihydroxypropyl, cyclohexyl, benzyl, phenyl, C₁-C₁₂-alkylphenyl, -CH₂-COO(C₁-C₁₈-alkyl), -CH₂CH₂-COO(C₁-C₁₈-alkyl) or -CH(CH₃)-COO(C₁-C₁₈-alkyl);

R₃₆ is hydrogen, C₁-C₁₂-alkyl optionally interrupted by one or more non adjacent -O-atoms, C₃-C₅-alkenyl, C₇-C₉-phenylalkyl, C₁-C₄-hydroxyalkyl, -CH₂CH₂CN, -CH₂CH₂COO(C₁-C₄-alkyl), C₂-C₁₂-alkanoyl or benzoyl;

with the proviso that the following compounds are excluded:



2. (original) Photoinitiators according to claim 1, wherein

n is 1 or 2;

L is a linker;

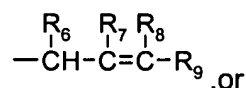
X is -O-, -S- or -NR₃₂-;

Z is a direct bond;

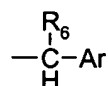
R₁ is

(a) linear or branched unsubstituted C₁-C₁₂-alkyl;

(b) a radical of the formula;



(d) a radical of the formula



wherein Ar is phenyl, which is unsubstituted or substituted by one or more of the groups NO₂, -N(R₁₀)₂, C₁-C₄-alkyl, C₁-C₄-alkoxy, C₁-C₄-alkylthio, phenoxy;

R₂ if n is 1, independently of R₁ has one of the meanings of R₁;

R₂ if n is 2, is C₂-C₈alkylene;

R₃ is C₁-C₄-alkyl, C₂-C₄-alkyl substituted by hydroxy, C₁-C₄-alkoxy; C₃-C₅-alkenyl;

R₄ independently of R₃ has one of the meanings of R₃; or R₄ together with R₃ is C₄-C₅-alkylene that may be interrupted by -O-, -N(R₁₃)-;

R₅ is hydrogen;

R₆, R₇, R₈ and R₉ independently of each other are hydrogen or methyl;

R₁₀ is hydrogen, C₁-C₄-alkyl or C₃-C₅-alkenyl;

R₁₃ is hydrogen or C₁-C₄-alkyl;

R₃₀ and R₃₁ independently of one another are hydrogen, C₁-C₁₂-alkyl; or C₂-C₆-alkyl substituted by hydroxy, C₁-C₄-alkoxy, -O-CO-(C₁-C₄-alkyl), or -COO(C₁-C₄-alkyl); allyl, cyclohexyl or C₇-C₉-phenylalkyl; or C₂-C₁₂-alkanoyl, benzoyl or norbornenoyl; or C₂-C₁₂-alkanoyl, benzoyl or norbornenoyl substituted by C₁-C₄-alkoxy, -COOH or -COO(C₁-C₄-alkyl); or C₃-C₅-alkenoyl; or -CO-NH-C₁-C₁₂-alkyl or -CO-NH-(C₀-C₁₂-alkylen)-N=C=O, optionally interrupted by one or two phenylene, methylphenylene, phenylene-O-phenylene, cyclohexanediyl, methylcyclohexanediyl, trimethylcyclohexanediyl, norbornanediyl, [1-3]diazetidione-2,4-dione-1,3-diyl, 3-(6-isocyanatohexyl)-biuret-1,5-diyl or 5-(6-isocyanatohexyl)-[1,3,5]triazinane-2,4,6-trione-1,3-diyl;

R₃₂ is hydrogen or C₁-C₁₂-alkyl.

3. **(original)** Photoinitiators according to claim 2, wherein

n is 1 or 2;

L is linear or branched C₂-C₁₈-alkanediyl;

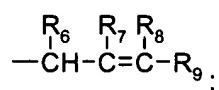
X is -O-;

Z is a direct bond;

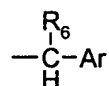
R₁ is

(a) linear or branched unsubstituted C₁-C₃-alkyl;

(b) a radical of the formula;



(d) a radical of the formula



where Ar is phenyl, which is unsubstituted or substituted by CH₃-NO₂ or -N(R₁₀)₂;

R₂ if n is 1, independently of R₁ has one of the meanings of R₁;

R₂ if n is 2, is C₂-C₈alkylene;

R₃ is methyl,

R₄ is methyl or R₄ together with R₃ is C₅-alkylene that is interrupted by -O-;

R₅ is hydrogen;

R₆, R₇, R₈ and R₉ are hydrogen;

R₁₀ is hydrogen;

R₃₀ and R₃₁ independently of one another are hydrogen, C₁-C₁₂-alkyl; or C₂-C₆-alkyl substituted by hydroxy; C₁-C₄-alkoxy, -O-CO-(C₁-C₄-alkyl), or C₃-C₅-alkenoyl.

4. **(currently amended)** Photoinitiators according to ~~any one of claims 1-3,~~ claim 1, wherein n is 1 or 2, R₁ is benzyl, 4-aminobenzyl, propyl or allyl and R₂ is ethyl or is C₂-C₈alkylene.

5. **(original)** A composition comprising

(A) at least one ethylenically unsaturated compound;

(B) a photoinitiator of formula I as defined in claim 1.

6-7. (cancelled)

8. (new) Photoinitiators according to claim 2, wherein n is 1 or 2, R₁ is benzyl, 4-aminobenzyl, propyl or allyl and R₂ is ethyl or is C₂-C₈alkylene.

9. (new) Photoinitiators according to claim 3, wherein n is 1 or 2, R₁ is benzyl, 4-aminobenzyl, propyl or allyl and R₂ is ethyl or is C₂-C₈alkylene.

10. (new) A method for photopolymerization of ethylenically unsaturated compounds or mixtures containing ethylenically unsaturated compounds which method comprises preparation of a composition comprising ethylenically unsaturated compounds and compounds of the formula I according to claim 1 and exposure of the composition to electromagnetic radiation.

11. (new) A method for the preparation of multifunctional photoinitiators by reaction of compounds of the formula I as defined in claim 1 with appropriate reagents.

12. (new) A method for the preparation of multifunctional photoinitiators according to claim 11 by reaction of compounds of the formula I as defined in claim 1 with acids, acid halides, acid anhydrides, lactones, aldehydes, ketones, isocyanates, sulfonic acid chlorides, alkyl halides, alkyl sulphonates, epoxides, acrylates, methacrylates, amines, alcohols and thioalcohols.